I CLAIM:

1. A flush valve diaphragm comprising a body portion and a peripheral sealing portion, the body portion being flexible and having a central passageway, the peripheral sealing portion comprising a sealing ring with a thickness greater than the body portion extending along the periphery of the flush valve diaphragm; a first integral ring on a first side of the flush valve diaphragm radially spaced from the sealing ring; a second integral ring on a second side of the flush valve diaphragm radially spaced from the sealing ring; an integral filter located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring; a bypass chamber positioned between the first integral ring and the sealing ring, an exit chamber positioned between the second integral ring and the sealing ring; and a bypass orifice extending from and allowing fluid communication between the bypass chamber and the exit chamber.

2. The flush valve diaphragm of claim 1, wherein the integral filter comprises the filter orifices extending from the first side of the diaphragm, through the diaphragm to the second side of the diaphragm.

3. The flush valve diaphragm of claim 2, wherein each of the filter orifices have a filter orifice diameter, and the bypass orifice has a bypass orifice diameter, where each of the filter orifice diameters is smaller than the bypass orifice diameter.

4. The flush valve diaphragm of claim 2 wherein the first integral ring defines a plurality of circumferentially spaced support grooves, said flush valve diaphragm further comprising a plurality of radially extending chamber walls circumferentially spaced apart, and a plurality of chambers defined by at least one of said support grooves, a respective pair of chamber walls, a portion of the first integral ring, and a portion of the sealing ring, each chamber wall extending from the sealing ring to the first integral ring, wherein each chamber includes a set of the filter orifices in fluid communication with a circumferential passageway located between the sealing ring and the second integral ring.

5. The flush valve diaphragm of claim 4 wherein the circumferential passageway comprises the filter orifices and a plurality of circumferential supports having

flow through passages, the circumferential supports extending from the sealing ring to the second integral ring.

6. The flush valve diaphragm of claim 5, wherein the circumferential passageway is in fluid communication with at least one flow path orifice, and wherein the circumferential passageway comprises a first dam wall at a first end of the circumferential passageway, a second dam wall at a second end of the circumferential passageway, the flow path orifices being in fluid communication with the bypass chamber.

7. The flush valve diaphragm of claim 6, wherein the exit chamber comprises two exit passageways located along the second integral ring and a diverter shield located between the two exit passageways.

8. The flush valve diaphragm of claim 1, wherein the diaphragm body is made of a material selected from the group consisting of natural rubber, synthetic rubber, synthetic polymer, and thermoplastic elastomer resin.

9. A flush valve diaphragm comprising:

A) a flexible body portion comprising a central passageway; and

B) a peripheral sealing portion comprising:

i) a sealing ring with a thickness greater than the body portion extending along the periphery of the flush valve diaphragm;

ii) a first integral ring on a first side of the flush valve diaphragm radially spaced from the sealing ring;

iii) a second integral ring on a second side of the flush valve diaphragm radially spaced from the sealing ring; and

iv) an integral filter located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, the integral filter comprising:

(a) a plurality of circumferentially spaced filter orifices located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, the filter orifices extending from the first side of the diaphragm, through the diaphragm to the second side of the diaphragm;

(b) a plurality of circumferentially spaced support grooves defined by the first integral ring;

(c) a plurality of radially extending chamber walls circumferentially spaced apart, each chamber wall extending from the sealing ring to the first integral ring;

(d) a plurality of chambers defined by at least one of said support grooves, a respective pair of chamber walls, a portion of the first integral ring, a portion of the sealing ring, wherein each chamber includes a set of the filter orifices;

(e) a circumferential passageway located between the sealing ring and the second integral ring, wherein the circumferential passageway comprises a plurality of circumferential supports, each having a flow through passage, the circumferential supports extending from the sealing ring to the second integral ring, the plurality of filter orifices; a first dam wall at a first end of the circumferential passageway, and a second dam wall at a second end of the circumferential passageway;

(f) a bypass chamber positioned between the first integral ring and the sealing ring comprising at least one flow path orifice and a bypass orifice; and

(e) an exit chamber comprising at least one exit passageway located along the second integral ring and the bypass orifice, allowing fluid communication between the bypass chamber and the exit chamber such that water flowing through the diaphragm enters through one of the support grooves into the respective chamber and flows through one or more filter orifices, along the circumferential passageway, through the at least one flow path orifice into the bypass chamber, through the bypass orifice into the exit chamber, through the at least one exit passageway and out of the flush valve diaphragm.

10. The flush valve diaphragm of claim 9, wherein the bypass chamber comprises at least one flow path orifice adjacent to the first dam wall, at least one flow path orifice adjacent to the second dam wall, and the bypass orifice centrally located between the flow path orifices.

11. The flush valve diaphragm of claim 10, wherein each of the filter orifices have a filter orifice diameter and the bypass orifice has a bypass orifice diameter, where each of the filter orifice diameters is smaller than the bypass orifice diameter.

12. A flush valve diaphragm assembly for use in a flush valve, comprising:

a) a flush valve diaphragm comprising a body portion and a peripheral sealing portion; the body portion being flexible and having a central passageway; the peripheral sealing portion comprising a sealing ring with a thickness greater than the body portion extending along the periphery of the flush valve diaphragm, a first integral ring on a first side of the flush valve diaphragm radially spaced from the sealing ring, a second integral ring on a second side of the flush valve diaphragm radially spaced from the sealing ring, and an integral filter located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring; a bypass chamber positioned between the first integral ring and the sealing ring, an exit chamber positioned between the second integral ring and the sealing ring, and a bypass orifice extending from and allowing fluid communication between the bypass chamber and the exit chamber; and

b) a barrel slide, which is partially passed through the central passageway to which the diaphragm is secured.

13. The flush valve diaphragm assembly of claim 12, wherein the barrel slide is secured to the diaphragm through a locking member.

14. The flush valve diaphragm assembly of claim 13, wherein the locking member is threadably received by the barrel slide sandwiching a portion of the diaphragm between a support lip on the barrel slide and the locking element.

15. The flush valve diaphragm assembly of claim 14, comprising an integral flow ring located between the first side of the diaphragm and the support lip of the locking member.

16. A flush valve, comprising:

a) a valve body defining an inlet opening and an outlet opening;

b) a valve seat positioned between the inlet and the outlet of the flush valve;

c) a flush valve diaphragm assembly movable to a closing position on the valve seat to stop flow between the inlet and the outlet; and

d) a diaphragm assembly positioned in the valve body and separating the inlet and the outlet, with the diaphragm assembly configured to have a pressure difference applied across the diaphragm assembly and said diaphragm assembly comprising:

i) a flush valve diaphragm comprising a body portion and a peripheral sealing portion; the body portion being flexible and having a central passageway; the peripheral sealing portion comprising a sealing ring with a thickness greater than the body portion extending along the periphery of the flush valve diaphragm, a first integral ring on a first side of the flush valve diaphragm radially spaced from the sealing ring, a second integral ring on a second side of the flush valve diaphragm radially spaced from the sealing ring, and an integral filter located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, the integral filter comprising a plurality of circumferentially spaced support groves defined in the first integral ring, a plurality of circumferentially spaced filter orifices located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, a circumferential passageway located between the sealing ring and the second integral ring, a bypass chamber positioned between the first integral ring and the sealing ring, an exit chamber positioned between the second integral ring and the sealing ring, at least one flow path orifice extending from and allowing fluid communication between the circumferential passageway and the bypass chamber, and a bypass orifice extending from and allowing fluid communication between the bypass chamber and the exit chamber; and

ii) a barrel slide, which is partially passed through the central passageway to which the diaphragm is secured, whereby water enters through the inlet opening, flows through the diaphragm by entering through one of the support grooves and flows through one or more filter orifices, along the circumferential passageway, through the at least one flow path orifice into the bypass chamber, through the bypass orifice into the exit chamber and out of the flush valve diaphragm.

17. A method of filtering water passing through a flush valve comprising:

A) providing a flush valve comprising:

i) a valve body defining an inlet opening and an outlet opening;

ii) a valve seat positioned between the inlet and the outlet of the flush valve;

iii) a flush valve diaphragm assembly movable to a closing position on the valve seat to stop flow between the inlet and the outlet; and

iv) a diaphragm assembly positioned in the valve body and separating the inlet and the outlet, with the diaphragm assembly configured to have a pressure difference applied across the diaphragm assembly and said diaphragm assembly comprising:

(a) a flush valve diaphragm comprising a body portion and a peripheral sealing portion; the body portion being flexible and having a central passageway; the peripheral sealing portion comprising a sealing ring with a thickness greater than the body portion extending along the periphery of the flush valve diaphragm, a first integral ring on a first side of the flush valve diaphragm radially spaced from the sealing ring, a second integral ring on a second side of the flush valve diaphragm radially spaced from the sealing ring, and an integral filter located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, the integral filter comprising a plurality of circumferentially spaced support groves defined in the first integral ring, a plurality of circumferentially spaced filter orifices located between the sealing ring and the first integral ring and between the sealing ring and the second integral ring, a circumferential passageway located between the sealing ring and the second integral ring, a bypass chamber positioned between the first integral ring and the sealing ring, an exit chamber positioned between the second integral ring and the sealing ring, at least one flow path orifice extending from and allowing fluid communication between the circumferential passageway and the bypass chamber, and a bypass orifice extending from and allowing fluid communication between the bypass chamber and the exit chamber; and

(b) a barrel slide, which is partially passed through the central passageway to which the diaphragm is secured;

B) passing water from the inlet opening to the first side of the flush valve diaphragm;

C) passing water through one of the supports and through one or more filter orifices of a first size, along the circumferential passageway, through the at least one flow path orifice of a second size, into the bypass chamber, through the bypass orifice of a third size into the exit chamber, wherein the flow path orifice of a second size is greater than the filter orifices of a first size and the bypass orifice of a third size is greater than the filter orifices of a first size, the filter orifices preventing the passage of particulates larger than the first size, resulting in filtered water;

D) passing the filtered water out of the flush valve diaphragm; and

E) then passing the filtered water through the barrel slide to the outlet opening.